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ABSTRACT

College students (N=151) completed surveys assessing the relationship between e-mail use and extraversion. The variables studied included time spent on e-mail; the frequency of e-mail usage; and the purposes e-mail served for each student. The results suggest that extraverts use e-mail as a form of procrastination more than introverts, and that extraverts find e-mail to be more disruptive to their work. Introverts commonly prefer to stay within their own environment, and seem to use e-mail and the Internet primarily as a means of conducting research rather than as a means of participating in a more extensive communication network. Therefore, e-mail is not as distracting for introverted students. Although time spent on e-mail was not found to be significantly different for introverts and extraverts, the results suggest that this may be because introverts use e-mail regularly in completing academic assignments. Extraverts who are seeking greater companionship seem to make use of e-mail as a way of avoiding feeling alone. (Contains 10 references.) (JDM)

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The Educational Impact of E-Mail: Extraverted versus Introverted Students

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Abstract

College students (n=151) completed surveys assessing the relationship between e-mail use and extraversion. The variables studied included time spent on e-mail, the frequency of e-mail usage, and the purpose e-mail served for each student. Results suggest that extraverts use e-mail as a form of procrastination more than introverts, and that extraverts find e-mail to be more disruptive to their work. Introverts commonly prefer to stay within their own environment, and seem to use e-mail and the Internet primarily as a means of conducting research rather than as a means of participating in a more extensive communication network. Therefore, e-mail is not as distracting for introverted students.

Although time spent on e-mail was not found to be significantly different for introverts and extraverts, this may be because introverts use e-mail regularly in completing academic assignments (e.g., to conduct research). Extraverts, seeking greater companionship, seem to make use of e-mail as a way of avoiding feeling alone.

Introduction

New, pervasive information technologies are dramatically changing the lives of today's students. Increasing access to email and Internet sites, coupled with rising cell phone penetration and voice-mail use, have been associated with improved productivity in the workplace and higher levels of student achievement in several academic settings. Recent innovations have fostered more rapid communication within organizations and have permitted more widespread collaboration among more diverse groups of workers and students.

Although many extol the virtues of this technological explosion, others question its impact on students' and workers' quality of life and levels of stress. The pressure to assimilate today's endless flow of information, to stay abreast one's ever-accumulating e-mail and voice mail, and to protect time for other tasks presents current students with unparalleled challenges. The availability of myriad diversions with only a few key strokes tempts even diligent students to stray from taxing scholarly tasks. It seems likely that these potential distractions have a different impact on different types of students. Level of extraversion is likely to affect students' use of e-mail, because extraversion is associated with social stimulation seeking. The Internet offers extraverts infinite access to social interaction, which may often prove irresistible. For extraverted students struggling to stay focused on academic projects, the availability of email may prove to be quite disruptive.

Researchers are just beginning to examine the negative effects of excessive use of e-mail and related technologies. To Richard Laermer, a man interviewed by Koerner (1999), e-mail is as "integral to [his] life as his frontal lobes". Being a CEO of a major corporation, Laermer typically sends 500 messages a day. Never turning off his e-mail pager, he once drove 15 minutes away from his beach house while on vacation to pick up his pager's satellite system. Laermer was diagnosed an e-mail addict.

One study claims that this addiction could stem from undetected mood disorders. The sufferer of such affective disturbances wants to escape reality and create a new life, a cyber-life. Others argue that computer usage is a cause rather than a symptom of mental distress (Koerner, 1999). Some patients even complain of feeling suicidal when an electronic pen pal disappears.

Some hypothesize that the computer medium gives people a sense of power, especially those who do not feel a sense of power in their real lives. This context provides a sense of safety because contacts are faceless, and because it offers time to select what respondents are going to say (Koerner, 1999). People can be whom they want; for example, one 85-year-old man was scamming young girls into thinking he was a 25-year-old. This type of behavior could lead to pseudo-socialization, feelings of fraud, and ultimately increase the experience of social isolation.

In a study conducted by Kimberly Young regarding Internet use, it was found that 10% of Web users exhibited addictive behavior (Neumann, 1998). The notion that computer use itself might have addictive characteristics was left implicit; the study primarily focused on the notion that those with preexisting compulsive tendencies might express them in this medium.

The effects of compulsive computer-related behavior include risks to the individual; a decrease in social and intellectual skills, loss of motivation for constructive activities, and a loss of job and livelihood, are just a few examples (Neumann, 1998). A sense of time can be lost through computer activities. Computers "intensify and depersonalize whatever activity is being done, enabling it to be done remotely, more expeditiously, and perhaps without identification, accountability, or answerability" (Neumann, 1998).

Those addicted to computer use are doomed to stay indoors, lose sleep, and often have no social life outside the computer. Although they make believe that they are experiencing meaningful relationships, the truth remains that these interactions serve as a substitute for interpersonal communication. For example, multi-user dungeons (MUDs)

are competitive or collaborative computer games (Neumann, 1998). Many players choose to remain anonymous or pseudonymous, and become abstractions rather than real people.

It was found that chat room compulsives were particularly vulnerable to believing what they read (Neumann, 1998). The vulnerable state made people more susceptible to giving out their credit card number or, even worse, to believe in love over the NET.

Treatments for addictions involve abstinence. Ironically, people are increasingly turning to Internet counseling sites, known as Cybertherapy. Also, parental supervision for young abusers is recommended by many experts trying to help children with these problems..

In contrast, author Sherry Turkle says that "frequent disguising of identities helps some chat-line users open up their closed personalities" (Miller, 1996). She is a strong advocate for e-mail, claiming it is a major positive social/psychological phenomenon. Years ago, the relationship with computers was one-on-one, person with machine. Now, with e-mail and the Internet, people are using computers to develop new kinds of relationships with other people. However, there is a big controversy as to how far Internet relationships should unfold.

In January of 1995, one man filed for divorce from his wife after discovering erotic e-mail messages she and another man were exchanging. However, because she and the man never met, Turkle concludes that their affair was not real. She claims that cybersex is the equivalent of reading an erotic novel, not "tantamount to an actual rendezvous" (Miller, 1996). Computers, in her opinion, should not only be used for people's intellectual fantasies, but for erotic ones as well.

New York's first Internet-related sexual assault case arose from e-mail correspondence between two university students who met online (Ullman, 1998). Expressions of their sexual fantasies led to the two meeting off-line and the night ended violently.

In May of 1997, the male participant was sentenced to 15 years in prison for kidnapping and sexually assaulting the woman he met over the Internet. However, through legal maneuvering, all references the victim herself made in the emails to interest and participation in bondage and domination experiences were thrown out. The argument was that online people feel pressured to produce a "shocking, witty, outrageous or perverse persona lest they become cyberwallflowers" (Ullman, 1998).

On their off-line date, she accompanied the man to his apartment where they looked at art work that they had discussed in their e-mails; images included still lifes of corpses, and scenes of maimed people in various stages of torture. The two often wrote of death, snuff films, and dismemberment obsessions, and many times, it was proven that she began the conversations.

Later, she willingly disrobed and allowed the man to tie her up to his bed where he began to perform sadomasochistic sex on her. She admitted that she participated for three or more hours into their date but only did so because she had problems being assertive.

"Although her e-mail showed that she was very much a liberated woman of late Nineties cyberculture, the cybersex judge reached back into an earlier era of male-female relations and applied the rape-shield law" (Ullman, 1998).

Alternative identities may sometimes be constructive. Perhaps people should use the virtual to improve the real life. Online contexts give people an unconstrained place to experiment with alter egos and actually work out problems with the advice of those uninvolved. Turkle gives the example of a young man who had a problem being assertive (Miller, 1996). His treatment included role-playing in an online community; his role was to play an assertive woman. Afterwards, he was able to be more assertive in real life. However, some people may act out the same problems they have in real life in their virtual lives. One man was quoted saying, "Real life is just one more window—and it's usually not my best one" (Miller, 1996).

When it comes to children today, there seems to be no question as to whether they love e-mail or not. As a matter of fact, surveys have shown that about 16 million kids under the age of 18 have access to the Internet at home, and that e-mail is their main online activity (Silver & Perry 1999). Many children like to use e-mail to contact friends and family who are far away, and to ask teachers for homework help. However, there is a more negative side to kids using e-mail: "Since 1995, the FBI has arrested some 270 individuals who stalked children online" (Silver & Perry 1999). This is definitely something that parents today need to worry about.

On a different line of thought, some say the Internet may be used as a therapeutic tool (Miller, 1996). It was found that senior citizens were the fastest-growing groups online. They are using computers for building new supportive relationships.

E-mail tends to relax one's inhibitions (Miller, 1996). E-mail exists somewhere in between writing and speech; it is more spontaneous than writing because one can feel

the presence of the person being written, and yet, at the same time, one is able to compose words carefully. When alone, self-reflection is also a bonus (Miller, 1996).

In the Sannomiya et al. (2000) study, communication between a supervisor and two students in the course of a master's thesis was observed. The focus of the investigation was to see how they responded to computer-mediated communication. Student number one (S1) was supervised for 10 months through computer-mediated communication, while S2, was only supervised over the computer for the last two months before completing the thesis.

Five questions were asked during a face-to-face interview: "1) What are the advantages of computer-mediated communication compared to face-to-face communication? 2) What are the disadvantages? 3) Is heart-to-heart communication possible through computer-mediated communication? 4) Is it necessary to see each other's facial expressions when supervising a master's thesis? 5) Is it possible to supervise a master's thesis through the sole use of computer-mediated communication?" (Sannomiya et al., 2000).

Results suggested that this must be assessed in two stages during the drafting of a master's thesis; the Production stage and the Examination stage (Sannomiya et al., 2000). During the Production stage, a kind of trial-and-error in thinking is necessary. Students need to express many ideas and questions to their supervisor. Interactive communication with their supervisor is important; computer-mediated communication lacked facial expressions from the supervisor that could have proved to be encouraging to an idea or detrimental.

During the Examination stage it was found that the student and their supervisor had reached an understanding about the outline of the research (Sannomiya et al., 2000). In this stage, students construct their thoughts in more details and the supervisor needs in turn, to criticize the student's thinking. He needs to do so by carefully examining their thoughts. Since the process is "self-paced and not synchronous", communication does not force quick responses (Sannomiya et al., 2000). Computer-mediated communication in this stage enforces deeper thought by eliminating the constraints of back and forth speech.

Thus, it is important to consider how personality characteristics can mediate the impact of these changes, yielding different effects between groups. The dimension of extraversion (Eysenck,) has been consistently found to be associated with how individuals respond to a variety of situations.

Given the extraverted group's preference for social stimulation, they might be expected to have difficulty spending more time and energy in front of a monitor, without direct human contact. Alternatively, since email technology facilitates social interaction among users, permitting rapid and even simultaneous interactions with a huge number of contacts, extraverts may find this technology incredibly reinforcing. For some extraverts this may prove troublesome; the appeal of email interactions may prove irresistible, causing it to interfere with performance of other responsibilities.

The response of introverts to information technology is also somewhat difficult to predict. On the one hand, this technology offers members of this group certain advantages. It reduces the need for direct interpersonal interaction, providing introverts the chance to participate in conversations without their having to tolerate the discomfort

they typically experience in social situations. They are freed to share their ideas at a safe distance. In addition, they can regulate the flow of social stimulation they experience by limiting their exposure to communication from others, in a way that is impossible in face-to-face encounters. This ability to contribute remotely and to pace exposure optimally might enable introverts to function much more productively as a result of the new information technologies.

While this is theoretically true, in practice, the onslaught of email demands may be disadvantageous for many introverts, if they experience a steady stream of email and voice mail messages as incessant demands to interact with others. This relentless social pressure may overwhelm the introverted individual, leaving them feeling excessively stimulated and uncomfortable. The new technology (e-mail, voice mail, and cell phone) may all intrude upon the introvert's highly valued privacy, making if difficult for them to cope.

In order to assess these hypotheses, extraverts' and introverts' responses to email technology were assessed in a variety of ways. Extraverts were expected to make greater use of e-mail and to report finding it more distracting.

Overall, it seems as though people use e-mail primarily for social reasons, whether it be exchanging messages with friends and family or contributing notes to on-line chat groups. The Internet and e-mail have both become increasingly popular in recent years, but there may be some negative effects from them. Excessive communication through these e-mail channels may cause people to feel down and lonely, communicate less with family members, meet with their friends less often (Bower 1998).

Psychologist Robert Kraut of Carnegie Mellon University in Pittsburgh conducted a study to see if this was the case. He and his coworkers used 169 people from 73 Pittsburgh households as the subjects. The subjects' social involvement and psychological well-being was examined before and after their first 1 to 2 years of Internet use. Each family received a computer and software, an extra telephone line, E-mail accounts, and access to the Internet, all for free. The researchers were then able to monitor each family member's Internet use by having each volunteer complete periodic questionnaires and participate in interviews at their homes at the end of the study (Bower 1998).

The results showed that volunteers who used the Internet and e-mail frequently, "reported small but statistically significant drops in time spent talking with family members and in the size of their local circle of friends" (Bower 1998). Feelings of loneliness and signs of depression in the subjects also increased. "The isolation and unhappiness intensified as computer use expanded, regardless of race, age, sex, household income, and initial levels of social interaction and depression, the researchers contend" (Bower 1998). Furthermore, as reported by Draut and his colleagues in the September American Psychologist, it was found that teenagers who use the Internet and e-mail frequently reported more isolation and loneliness than the adults. The researchers suggested that "turmoil in adolescence may cause some teenagers to withdraw from social contacts and use the Internet as an escape" (Bower 1998).

Kraut and his colleagues propose that "the negative effects of Internet use may stem from the participants substituting shallow interactions--which often involved communicating with strangers--for more varied and supportive real-world contacts"

(Bower 1998). However, it was noted that it is not known if the findings would apply to other groups given free on-line access, people who are paying for on-line use, individuals who have a lot of Internet experience, or to Internet users who are participating in other forms of on-line communication.

Another aspect of e-mail that has been looked at is the issue of whether or not the use of e-mail is appropriate when conducting business. In Organizational Behavior and Human Decision Processes, Michael Morris, Ph.D., an associate professor of organizational behavior at Stanford Business School, conducted a study and compared the success rates of business negotiations made face to face, over the telephone, or through e-mail. Results found that "e-mail negotiations are the most likely to break down because threats and teasing can strain the relationship when unaccompanied by a human voice or facial expressions" (Smith 2000).

Morris notes that e-mail works better if you already know the person, since there is already a certain degree of trust present. It is hard to build trust over e-mail, but it is not hard to maintain it. Furthermore, Morris believes that an "ice-breaking, preliminary phone call" should be made if no shared history exists (Smith 2000). "Hearing each others' voices and maybe sharing a laugh or two creates a sense of being on the same wavelength and can make a substantial difference" (Smith 2000).

Many times, when there is an awkward or sensitive topic that needs to be discussed, people use e-mail instead of talking to the person directly. Morris feels that this is the worst time to use e-mail, even though it may be easier in the short term. "You need to be there, see the person's facial expression and maybe do some damage control" (Smith 2000).

It is sometimes thought that e-mail may be a challenge to other forms of media and communication systems, such as newspapers. This is what was believed back in March of 1997. A 1997 report by Forrester Research predicted that there would be three trends--"the exponential growth of e-mail use throughout the general population, the emergence of e-mail technology supporting the exchange of fully interactive HTML documents, and the rapid evolution of new sorts of 'intelligent' personal e-mail management software--are converging to change the way vast numbers of Americans will interact with local news organizations and advertisers" (Levins 1997). As part of the "People and Technology" research project, interviews with the executives of 50 corporations that analyze and/or operate large-scale e-mail activities across the United States were conducted. Some of the corporations included AT&T, American Online, Merrill Lynch, and Western Union. The study reported that "40 million Americans--or about 15% of the population--are currently using e-mail and that this number is rising at a rate that will reach 135 million--or 50% of the population--within five years" (Levins 1997).

Kate Delhagan, Forrester senior analyst, believes that most newspaper publishers do not fully understand the power and full potential of these new e-mail developments (Levins 1997). Forrester also pointed out that the Internet's four-year-old Mercury Mail Service sends "three million news-containing e-mail messages to 300,000 customers each week and that 1 million people signed up in a recent six week period for a new Netscape service that e-mails them fully interactive HTML pages containing news and features from the New York Times and other Web-based newspapers and magazines" (Levins 1997). Furthermore, the report projected that "e-mail will become such an essential

element of daily American life within 15 years that the federal government is likely to ultimately require Internet Service Providers (ISPs) to offer universal e-mail service to all households, much the same as AT&T was forced to provide non-profitable phone service to rural communities earlier this century" (Levins 1997). As a result of this, it was believed that people would eventually pay their bills, order their drug prescriptions, etc. through the use of e-mail. Also thought was that e-mail companies would become more like newspapers or shoppers' guides in order to keep up with the developing technology (Levins 1997). According to Forrester in 1997, this is what newspapers would have to compete with in the future. They projected "that by 2001, the typical e-mail-using consumer will participate in eight to 10 commercial activities per week, using electronic messaging the way they previously used the telephone or postal service to communicate with local and regional businesses and agencies" (Levins 1997).

All in all, it appears that the use of the Internet and e-mail becomes more and more popular each year. In a study titled, *The 1997 American Internet User Survey: Realities Beyond the Hype*, conducted by the research firm FIND/SVP, it was found that 31.3 million adults in the United States, (about 16 percent of the US's adult population), have access to the Internet, and half of them go online each day. The Technologies Research Group interviewed 1,000 users and 1,000 non-users between February 1 and April 15. It was further noted that the margin of the sampling error was plus or minus 3 percentage points.

However, in another survey, the Baruch College-Harris Poll commissioned by Business Week, it was suggested that 40 million adults were using the Internet and 23 million were using online services. "Estimates of the actual number of adult Americans

online vary widely from survey to survey, depending on who's doing the counting and how they're defining Internet users" (Society, 1997).

Despite these research differences, the overall consensus of the industry from 1997 shows that the number of Americans who used the Internet and online services on a regular basis doubled since 1996. The FIND/SVP study also found that e-mail is the greatest use of the Internet. It is used daily by 59 percent of everyone who has online access. (Society, 1997).

Furthermore, the survey found that the number of female users has tripled to 9.9 million. However, more women said that they would log on more often if there were more things on the Internet that they were interested in (Society, 1997). Out of the users who were surveyed, (both men and women), it was noted that they would be interested in exploring the following on the Internet in the future: adult education, online banking, health and medicine, personal investments, and travel. "These findings document the transition of the Internet from an over-hyped curiosity to a communications and information utility on which millions of Americans now rely" (Society, 1997).

Method

Subjects

Students surveyed were from a small (approximately 1,200 in population), private college in a suburb of Philadelphia, Pennsylvania. A Likert-format self-report questionnaire was developed by the authors. Items assessed the student's perception of their own personality type and usage of e-mail in a college environment; including the amount of time spent on e-mail, the frequency of usage, and the primary reasons for

usage. The data sheets were collected, and the data was entered; statistical analyses were performed through use of SPSS.

Results

Extraversion scores were calculated for each participant by totaling the directionally adjusted items on the Eysenk extraversion measure. A median split was used to create extraverted and introverted groups.

Between-group t-tests were performed on all measures. Extraverts reported using e-mail as a form of procrastination more than introverts (extraverts: x= 2.71, s.d.= .83, n= 84 versus introverts: x= 2.37, s.d.= .78, n= 67; t= 2.58, df= 149, p= .011). The data also shows that extraverts report finding e-mail more disruptive to their work than introverts (extraverts: x= 2.54, s.d.= .75, n= 84 versus introverts: x= 2.12, s.d.= .83, n= 67; t= 3.24, df= 149, p= .001).

No significant difference between extraverts and introverts was found in terms of how often people communicated through e-mail (extraverts: x= 5.11, s.d.= 1.10, n= 84 versus introverts: x= 4.78, s.d.= 1.04, n= 67; t= 1.88, df= 149, p= .062). The difference between extraverts and introverts in terms of time spent on e-mail was also found to be non-significant (extraverts: x= 31.61, s.d.= 34.95, n= 84 versus introverts: x= 29.78, s.d.= 36.67, n= 67; t= .313, df= 149, p= .755). However, the range of time spent on e-mail was much greater for introverts than for extraverts (0-280 minutes for introverts versus 1-180 minutes for extraverts).

Discussion

The current findings suggest that e-mail technology may be creating a greater burden for extraverts than introverts. Extraverts are using e-mail as a form of procrastination and as a result it is disrupting their work. Extraversion was once thought to be a personality attribute with positive implications for school and workplace performance. These findings now begin to suggest that introversion may be becoming more of an asset and extraversion may be becoming more of a liability, given the increasing access to technologies such as e-mail.

Extraverts are spending more total minutes on e-mail per episode; their greatest reported use was 180 minutes per day. That amount of time, coupled with the number of times e-mail is checked per day, significantly detract from time and energy available for other pursuits. Although introverts also spend considerable time using e-mail, more of that activity was work-related.

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